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Investigation of red-cockaded woodpeckers in Virginia: 2007 report

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Cover Photo: Female Red-cockaded Woodpecker that migrated to Piney Grove from Tyrell County, North Carolina in autumn 2007 *by Bobby Clontz.*

The Center for Conservation Biology is an organization dedicated to discovering innovative solutions to environmental problems that are both scientifically sound and practical within today's social context. Our philosophy has been to use a general systems approach to locate critical information needs and to plot a deliberate course of action to reach what we believe are essential information endpoints.

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Executive Summary

During the calendar year of 2007, 35 Red-cockaded Woodpeckers were identified within Piney Grove preserve (Table 1). This included 19 birds that were born at the site and resident from previous years, 9 chicks/fledglings produced during the 2007 breeding season, 6 birds translocated to Piney Grove in previous years, and 1 bird that emigrated from the Peartree-Palmetto Preserve in Tyrell County, North Carolina. During the winter of 2007, birds were roosting in 8 different cluster areas including C-1, C-3, C-4, C-5, C-6, C-7, C-8, and C-10.

Six breeding pairs produced 9 nestlings that survived to fledging age during the 2007 breeding season. This represents an increase of 1 breeding pair over 2006, 3 over 2005, and 2 over 2004. This was the first year that breeding took place at Cluster 8 as it became the third recruitment cluster supporting a breeding pair. Young birds were produced at C-1, C-3, C-5, C-7, C-8, and C-10. A new breeding male was discovered at C-1 and paired with the female that has been breeding at this site since 2003. A full clutch of 3 eggs was eventually reduced to once chick that was banded and successfully fledged. The breeding pair in C-3 remained the same since 2005. This pair successfully fledged 1 nestling. At the time of banding, one unhatched egg remained in the nest. The breeding pair at C-5 was replaced marking the second consecutive year that the breeding male at this cluster was replaced. Two nestlings at C-5 were banded and successfully fledged. In C-7, the breeding male continued to remain the same individual since 2005 but the female was replaced since 2006. This pair hatched 2 eggs with only one nestling still present at the time of banding. The banded nestling successfully fledged. First breeding by birds in C-8 resulted in a clutch of 3 eggs but only 2 hatched. These nestlings were banded and successfully fledged.

In 2007, Piney Grove contained 118 cavities in live trees including 25 start cavities, 35 completed cavities, and 58 artificial inserts. Among the available natural cavities or inserts, 28 had fresh or recent chipping and sap flow from resin wells in 2007. Twenty-three available natural cavities or inserts had fresh or recent chipping and sap flow from resin wells in December 2007. Of the 58 inserts in live trees, 7 (12%) had fresh or recent resin work. Of the 36 natural cavities, 21 (58%) had fresh or recent resin work. Nine new cavities were added in 2007

There were 32 instances of cavity competitors in RCW cavities during the 2007 calendar year. Southern flying squirrels accounted for 20 of the 32 occurrences (62%). A total of 28 individual flying squirrels were removed on 20 occasions from 13 of the 92 available cavity trees. Thirty percent of the available RCW cavities contained occupants in 2007. Of the 20 occurrences of flying squirrels, six (36%) occurred in three of the four inserts in cluster C-9 (Table 4). Clusters C-9, C-10 and C-14 combined had 13 of the 20 occurrences (65%). Ninety five percent of the squirrels and 87% of all non-RCW occupants were found in artificial inserts.

BACKGROUND

Context

The Red-cockaded Woodpecker (*Picoides borealis*) is a federally endangered species. Within the past 100 years Red-cockaded Woodpeckers have disappeared completely from the northern portion of their breeding range. Historically, this species was recorded north into New Jersey and Pennsylvania. As recently as the 1930's and 1940's resident birds were known from the open maritime forests of Maryland. Since the recent loss of habitat in Kentucky, Virginia has supported the only population north of the Carolinas. In Virginia, breeding has continued to the present time but the number of both sites and birds has declined dramatically over the past 40 years. As recently as 1977, 23 clans were known scattered across 5 counties. In 1980, all clusters determined to be active in 1977 were surveyed in preparation for an investigation of habitat use (Bradshaw 1990). Of the 23 original clusters, only 9 were still forested. In the 4 years from 1977 to 1980, more than half of the known state population had been lost. By 1990, only 5 of the original 23 clusters detected in 1977 were still active. By 2000, this number had declined to only 2 clusters. During the breeding season of 2002, Virginia supported only 2 breeding pairs and 2 clusters with solitary males.

The Red-cockaded Woodpecker remains in eminent danger of extinction within Virginia. However, in 1998 a multi-organizational partnership was formed under the primary mission of stabilizing the population and restoring it back to pre-1980 levels. During that year, The Nature Conservancy negotiated a deal with Hancock Timber to purchase 1,100 ha of land supporting the last 3 known Red-cockaded Woodpecker breeding groups. The site has since been expanded and now includes 1,270 ha of pine land. The tract, located in Sussex County is named the Piney Grove Preserve and lies in the heart of the species former Virginia range. The site has become the nucleus for restoration work in Virginia.

Restoration of the Red-cockaded Woodpecker population in Virginia will require a long-term commitment and the use of aggressive techniques that have proven successful further south. Dramatic habitat management, population monitoring and management, and translocation of birds into the population have been ongoing since 2000 and are beginning to show promising results.

Objectives

The primary objective of this ongoing project is to monitor the population of Red-cockaded Woodpeckers within the Piney Grove Preserve. A secondary objective is to collect information relevant to the continued management of birds and their habitat in Virginia. Specific objectives include

1) To determine the number and identification of all birds resident within Piney Grove during the 2007 calendar year.
2) To monitor breeding activity in order to document productivity and allow for the unique banding of all individuals within the population.
3) To monitor and manage nest trees and cavity condition.

METHODS

Description

Piney Grove Preserve contains an old-growth loblolly and short-leaf pine community in Sussex County, Virginia. The site supports a complex of moderate-age pine stands interspersed with pockets of older trees ranging from 80 to 140 years. Historically, the site was managed for saw timber on a relatively long rotation by Gray Lumber Company. The site was purchased by Hancock Timber Resource Group in 1993. Under Hancock Timber's management, site quality was improved by removing the dense hardwood understory. The Nature Conservancy purchased the tract from Hancock Timber in 1998. The Nature Conservancy has developed an aggressive management program designed to restore the disturbance regime necessary to return the site to an open pine savannah.

A single clan of Red-cockaded Woodpeckers was discovered within this site in 1985. A second clan was discovered in 1994 and a third in 1995. These 3 clans still remain active. Since 1999, there have been 12 recruitment clusters established by The Nature Conservancy through the installation of artificial cavities. There are now 15 independent cluster sites with either natural or artificial cavities.

Banding

Being able to identify individual birds is an essential element of the monitoring program. Banding individuals with unique combinations of color bands allows for their identification and, for this reason, has been one of the project goals.

Adults – Adult birds are captured using a specialized net mounted on a telescopic pole shortly after they roost at dusk. The birds are "roosted" and the net is raised in place and the bird is enticed out into the net. Net poles are only effective on cavities below 50 feet in height. In 1998, Don Schwab banded 10 Red-cockaded Woodpeckers within the Piney Grove complex. In 2000, 7 of these birds were still resident within Piney Grove. During 2000, Bryan Watts banded an additional 4 adult birds, leaving only 2 unbanded birds in the population (1 each in clusters 3 and 5). The 2 remaining unbanded adults within clusters 3 and 5 were lost during 2004 and 2005 respectively. Since this time, all birds within the population have been individually identified by unique, color-band combinations.

Nestlings – For logistical and safety reasons, banding of Red-cockaded Woodpecker nestlings is restricted to an age window of 5-10 days. Because of this restriction, close monitoring of breeding activity is essential to successful banding. During the early portion of the breeding season, both the breeding pair and the nest cavity from each cluster area were monitored closely to determine clutch initiation dates. Where cavity height permits, breeding status is determined via the use of a miniature video camera mounted on an extendable pole. The pole can accommodate cavity heights to 50 ft. For cavities exceeding that height, breeding status was determined by visual monitoring of activity at the cavity. After dates of incubation were determined, an estimated hatching date was calculated. Nest cavities were

monitored closely around the time of expected hatching to verify hatch dates. The window for banding was determined from estimated hatching dates.

All nestlings were banded during the recommended age window. Nest trees were climbed with ladders and nestlings were extracted from cavities using a noose apparatus. Nestlings were then lowered to the ground, banded, and returned to the cavity. Each nestling received a unique combination of color bands as described above. Nestlings were weighed at the time of banding using a Pesola spring scale. In the first 2 weeks after fledging, birds were identified and sex was determined by crown plumage.

General Observations

As in previous years, 2 systematic surveys of all birds within Piney Grove were conducted to identify individuals and to determine distribution. Surveys were conducted in the early spring prior to the expected breeding window and in early winter after the expected dispersal period. All clusters were visited before dawn to count the number of individuals emerging from roost cavities and/or joining emerging birds to determine clan size. Birds were followed while foraging so that color band combinations could be read with spotting scopes. Biologists systematically worked through all sites over a period of days until all individuals were identified. Once clutches were laid, observations were made at the nest cavity to identify the breeding male and female for each site.

Cavity Monitoring and Management

Cavity tree status – Data on the status of each cavity tree were collected during March and April 2007. Each cavity tree was visited once for 2007 to evaluate tree characteristics and characteristics for each cavity on the tree. Tree condition was categorized into the following: live or dead; standing, broken or fallen; beetles; lightning strike; and red heart disease. Characteristics of each cavity were collected to describe its condition, entrance, plate, and activity status (Appendix I). All cavity trees were reevaluated in December 2007 to determine if active or inactive. Cavity characteristics were categorized as follows:

Cavity stage/ 06 Condition:

1-Complete – Natural cavity
2-Complete (New) – Newly completed since last update
3-Advanced Start: > 10 cm centimeter depth
4-Start: 1-10 cm depth
5-Sub-start: Less than one centimeter depth
6-Insert – Artificial cavity

Entrance enlargement:

0-Gone
1-Normal size entrance
2-Enlarged less than twice the normal diameter

3-Enlarged two to four times the normal diameter
4-Enlarged more than four times the normal diameter
R-Restrictor plate reducing entrance to normal size
H-Healing over

Activity:

1-Active: Chipping on resin wells to some degree with fresh sap flow
2-Possibly active: Slight but inconclusive evidence of RCW activity
3-Inactive: No recent RCW activity
4-Relic: No RCW activity for 4 years

Plate size:

5-Unstarted: No plate
4-Started: 0-15 cm diameter plate
3-Completed: 15-30 cm diameter plate
2-Completed: 30-45 cm diameter plate
1-Completed: Greater than 45 cm diameter plate

Chipping on resin wells:

4-Old: No recent RCW activity
3-Recent: Few resin wells have little chipping with little to no sap flow
2-Fresh: Most of resin wells have chipping and bark scaled slightly
1-Fresh: All resin wells have chipping and bark scaled extensively

Sap (applies to fresh and dry):

4-None
3-Less than 1 m of sap flow above and below the cavity
2-One to 2 m of sap flow above and below the cavity
1-Greater than 2m of sap flow above and below cavity around circumference of tree at cavity height

Cavity competitor inspection and removal – All active, completed inactive cavities, and artificial cavity inserts within 50 ft from the ground were checked on a one-month cycle using a camera and monitor mounted on a telescoping pole. Relic cavities were only revisited in December 2007. When cavity competitors were located, the tree was climbed to remove the competitor or nest material. Amphibians, wasps and bird nests with a tending adult, fresh eggs, or nestlings were not removed.

Historic Sites

Historic sites were not visited this season since most have been degraded and no longer have the potential to support RCWs.

RESULTS

Population Monitoring

During the calendar year of 2007, 35 Red-cockaded Woodpeckers were identified within Piney Grove preserve (Table 1). This included 19 resident birds that were born at the site in previous years, 9 successful fledglings produced during the 2007 breeding season, 6 birds translocated to Piney Grove in previous years, and 1 bird (RE/YE/RE, AL/OR) that emigrated from the Peartree-Palmetto Preserve in Tyrell County, North Carolina.

Six of the 19 naturally resident birds were born in 2006, 4 were born in 2005, 4 were born in 2004, 1 was born in 2003, 2 were born in 2002, and 2 were born in 2000. The group of translocated birds included 1 bird that was moved here from Gates County, NC in the spring of 2002, 1 bird that was translocated from Carolina Sandhills, NWR in the fall of 2002, 2 birds that were translocated from Carolina Sandhills in the fall of 2003, and 2 birds that were translocated from Carolina Sandhills during the fall of 2005.

Six birds were believed to be lost between the fall of 2006 and the winter 2007 including 1 bird that had been banded as an adult in 1998, 1 bird banded as a nestling in 2000, 2 birds banded as nestling in 2001, 1 bird banded as a nestling in 2003, and 1 bird translocated to Piney Grove in the fall of 2003.

Twenty-one birds were believed to be present within the Piney Grove preserve going into the breeding season of 2006 (Table 1). This compares to 21, 22, 21, 19, and 16 birds going into the breeding seasons of 2006, 2005, 2004, 2003, and 2002 respectively. Birds detected in spring included 2 birds banded as nestlings in 2000, 1 bird banded as a nestling in 2001, 1 bird banded as a nestling in 2003, 3 birds banded as nestlings in 2004, 4 birds banded as nestlings in 2005, 4 birds banded as nestlings in 2006, 1 bird translocated from Gates County, NC in 2002, 1 bird translocated from Carolina Sandhills, NWR in the fall of 2002, 3 birds translocated from Carolina Sandhills, NWR in 2003, and 2 birds translocated from Carolina Sandhills, NWR in 2004. There were 2 additional birds not detected during spring surveys but later found to be participating in breeding activities. This includes 1 bird detected as a breeder in Cluster 8 and originally banded as a nestling in 2004, and 1 bird helping to incubate and feed young in Cluster 3 and originally banded as a nestling in 2006.

Table 1. Occurrence of individual Red-cockaded Woodpeckers at Piney Grove Preserve (1998-2007).

FWS	Left Leg	Right Leg	Sex	1998	2000	2001	2002	2003	2004	2005	2006	2007 Spr	2007 Fall
Piney Grove													
1581-66204	RE/DB/RE	PU1/AL	F	X									
1581-66208	RE/DB/RE	PK1/AL	U	X									
1581-66210	WH/LB/WH	DB1/AL	U	X									
1581-66201	WH/LB/WH	RE/AL	M	X	X								
1581-66209	DG/YE/DG	PU/AL	F	X	X								
1581-66206	DG/YE/DG	DB/AL	M	X	X								
1581-66203	RE/DB/RE	YE/AL	F	X	X	X	X	X					
1581-66205	RE/DB/RE	DG/AL	M	X	X	X	X	X					
1581-66202	WH/LB/WH	LG/AL	M	X	X	X	X	X	X	X			
1581-66207	WH/LB/WH	WH/AL	F	X	X	X	X	X	X	X	X		
1581-66213	WH/LB/WH	DB2/AL	F		X								
1581-66216	RE/DB	RE1/AL	U		X								
1581-66221	WH/LB/WH	PK1/AL	U		X								
1581-66211	DG/YE/DG	RE1/AL	F		X								
1581-66223	DG/YE/DG	YE/AL	F		X								
1581-66222	WH/LB/WH	AL/RE	U		X	X							
1581-66219	DG/YE/DG	WH/AL	M		X	X	X						
1581-66215	RE/DB	LG1/AL	U		X	A	X	X	X				
C-3 Unbanded	Unbanded	Unbanded	U		X	X	X	X	X				
1581-66214	RE/DB	WH/AL	M		X	X	X	X	X	X	X	X	X
1581-66212	WH/LB/WH	YE/AL	M		X	X	X	X	X	X			
1581-66220	WH/LB/WH	PU/AL	U		X	?	?	?	X	X		X	X
C-5 Unbanded	Unbanded	Unbanded	M		X	X	X	X	X	X			
1581-66225	RE/DB/RE	RE2/AL	M			X							
1581-66226	RE/DB/RE	LG2/AL	F			X							
1581-66227	RE/DB/RE	PK2/AL	M			X	X						
1581-66229	WH/LB/WH	DG/AL	F			X	X						
1581-66228	RE/DB/RE	PU2/AL	M			X	X	X	X				
1581-66224	DG/YE/DG	RE2/AL	M			X	X	X	X	X	X		
1581-66231	WH/LB/WH	PK2/AL	M			X	X	X	X	X	X		
1581-66236	RE/DB/RE	AL/DB	M				X						
1581-66232	WH/LB/WH	AL/DB	M				X	X					
1581-66233	WH/LB/WH	AL/LB	F				X	X					
1581-66234	RE/DB/RE	AL/YE	F				X	X					
1581-66230	WH/LB/WH	AL/YE	F				X	X	X	X	X	X	
1581-66235	RE/DB/RE	AL/RE	F				X	X	A	X	X		X
1581-66239	WH/LB/WH	AL/DG	U					X					
1581-66240	WH/LB/WH	AL/LG	M					X					
1581-66243	RE/DB/RE	AL/PK	F					X					

Table 1 continued

FWS	Left Leg	Right Leg	Sex	1998	2000	2001	2002	2003	2004	2005	2006	2007 Spr	2007 Fall
1581-66246	DG/YE/DG	AL/PU	U					X					
1581-66238	WH/LB/WH	AL/PU	F					X	X			X	X
1581-66244	RE/DB/RE	AL/DG	M					X	X				
1581-66242	RE/DB/RE	AL/LB	F					X	X				
1581-66237	WH/LB/WH	AL/RE	M					X	?	X			
1581-66245	DG/YE/DG	AL/LB	M					X	X	X	X		
1581-66249	DG/YE/DG	AL/DB	U						X				
1581-66247	DG/YE/DG	AL/WH	U						X				
1581-66248	DG/YE/DG	AL/PU	M						X				
1581-66241	DG/YE/DG	AL/LG	F						X				
1581-66250	LB/WH/LB	AL/PK	M						X	X			
1581-66252	LB/WH/LB	AL/LB	F						X	X			
1581-66254	DB/RE/DB	AL/RE	M						X	X	A	X	X
1581-66251	LB/WH/LB	AL/DB	M						X	X	X		X
1581-66253	DB/RE/DB	AL/WH	F						X	X	X	X	X
1581-66259	DG/YE/DG	AL/DG	F							X			
1581-66256	LB/WH/LB	AL/OR	F							X			
1581-66262	DB/RE/DB	AL/YE	F							X			
1581-66257	LB/WH/LB	AL/RE	M							X	X	X	X
1581-66258	LB/WH/LB	AL/YE	F							X	X	X	X
1581-66260	DG/YE/DG	AL/OR	F							X			
1581-66261	DB/RE/DB	AL/DB	M							X	X	X	X
1581-66263	DB/RE/DB	AL/PU	F							X	X		X
1581-66264	WH/RE/WH	AL/DG	F							X	X	X	
1581-66265	LB/WH/LB	AL/WH	F								X	X	X
1581-66266	LB/WH/LB	RE/AL	F								X		X
1581-66267	WH/RE/WH	AL/RE	F								X		X
1581-66268	WH/RE/WH	AL/YE	M								X	X	
1581-66269	DG/YE/DG	YE/AL	M								X	X	X
1581-66270	DG/YE/DG	WH/AL	M								X		
1581-66271	DB/RE/DB	YE/AL	F								X		
1581-66272	OR/OR/OR	RE/AL	M								X		
1581-66273	WH/RE/WH	AL/WH	M										X
1581-66274	WH/RE/WH	AL/DB	M										X
1581-66276	DG/YE/DG	OR/AL	F										X
1581-66277	LB/WH/LB	YE/AL	F										X
1581-66278	LB/WH/LB	OR/AL	F										X
1581-66275	OR/AL	DB/RE/DB	F										
1581-66281	OR/OR/OR	YE/AL	F										X
1581-66279	YE/DB/YE	AL/RE	F										X
1581-66280	YE/DB/YE	AL/YE	M										X

Table 1 continued

FWS	Left Leg	Right Leg	Sex	1998	2000	2001	2002	2003	2004	2005	2006	2007	2007
Translocated Birds												**Spr**	**Fall**
1751-83047	AL/LG	DB/DB/YE	M			**X**							
1681-89697	AL/LB	ST/ST/OR	F			**X**							
1681-89743	AL/DG	WH/WH/PU	F			**X**	**X**						
1751-42837	YE/DB/YE	WH/AL	M				**X**						
1751-42838	YE/DB/YE	LG/AL	M				**X**						
801-40249	BK/YE/DB	RE/AL	F				**X**	**X**	**X**	**X**	**X**	**X**	**X**
1751-83163	AL/OR	DG/DG/OR	F				**X**						
1751-83133	AL/WH	ST/ST/OR	F				**X**						
1751-83208	AL/OR	WH/WH/MV	M				**X**						
1681-89800	AL/LG	PU/PU/LG	M				**X**						
1751-82968	AL/WH	OR/OR/DB	F				**X**						
1751-83201	AL/OR	WH/WH/LB	F				**X**						
1751-83213	AL/OR	OR/OR/LG	M				**X**						
1751-83142	AL/OR	DB/DB/WH	M				**X**	**X**	**X**	**X**	**X**	**X**	**X**
1751-83234	AL/YE	WH/WH/WH	F					**X**					
951-26443	AL/YE	DG/DG/LG	F					**X**					
951-26448	AL/YE	DG/DG/MV	M					**X**	**A**	**X**	**X**		
1751-83183	AL/OR	YE/YE/WH	M					**X**	**X**	**X**	**X**	**X**	
951-26305	AL/YE	YE/YE/WH	M					**X**	**X**	**X**	**X**	**X**	**X**
1581-66262	WH/WH/WH	AL/WH	M							**X**			
941-92246	AL / ST	OR/OR/YE	M							**X**			
1951-05035	AL / PU	WH/WH/MV	M							**X**			
1951-05086	AL/MV	MV/MV/WH	F							**X**	**X**	**X**	**X**
941-92233	AL / ST	WH/WH/LG	F							**X**	**X**		
941-92268	AL / ST	PU/PU/WH	F							**X**			
Foreign Birds													
Unknown	MV/LG	LG/AL	U							**X**			
1841-53714	RE/YE/RE	AL/OR	F										**X**

Thirty birds were identified within Piney Grove during the early winter of 2007 (Table 1). These included 16 birds that were produced on site before 2007, 8 birds that were banded as nestlings in 2007, 5 translocated birds that were moved to Piney Grove over the years, and one foreign bird that naturally migrated from North Carolina. There were 3 birds detected in the fall that were not detected in spring nor were they detected during breeding. This included 2 birds that had previously been detected in each year since being banded as nestlings (one bird banded in 2002 and the other in 2005).

Five birds seen during the spring survey were not seen during the winter survey; this includes 1 bird banded as a nestling in 2001, 1 bird banded as a nestling in 2005 (breeding female from C-10), 1 bird banded as a nestling in 2006, 1 bird that was banded as a nestling in 2007, and one translocated bird from the Carolina Sandhills, NWR brought to Piney Grove in 2003. The translocated bird was originally placed at C-6 in 2003 and remained a resident there until this winter. In addition, the breeding female at C-8 was not detected in spring, but then found to be breeding in summer, then not detected during winter. This bird was originally banded as a nestling in 2004 but was not seen in 2005 or 2006.

In the winter assessment, birds were roosting in 8 different cluster areas including C-1, C-3, C-4, C-5, C-6, C-7, C-8, and C-10 (Table 2). Considerable interaction was observed between these locations. As in the past, the single bird roosting in C-4 was part of the C-3 clan. Some intermixing and interactions were observed between the C-3 and C-5 clans along the boundary between these locations. Cluster 10 individuals were also observed mixing in with C-7 individuals. Birds emerging in C-1 were regularly being joined by 1 or more birds often from southeasterly direction.

Table 2. Roost clusters for Red-cockaded Woodpeckers detected within Piney Grove Preserve during the 2007 winter assessment.

Roost Cluster	FWS	Left Leg	Right Leg	Sex	Age
C-1	1581-66265	LB/WH/LB	AL/WH	F	2
C-1	1751-83142	AL/OR	DB/DB/WH	M	5
C-1	1581-66270	DG/YE/DG	WH/AL	M	2
C-1	1581-66276	DG/YE/DG	OR/AL	F	0
One of the birds listed below in the C-3 clan was roosting in C-4 but individual not identified					
C-3	1581-66253	DB/RE/DB	AL/WH	F	4
C-3	1581-66261	DB/RE/DB	AL/DB	M	2
C-3	801-40249	BK/YE/DB	RE/AL	F	≥7
C-3	1581-66271	DB/RE/DB	YE/AL	F	2
C-3	1581-66254	DB/RE/DB	AL/RE	M	3
C-3	1581-66214	RE/DB	WH/AL	M	8
C-3	1581-66235	RE/DB/RE	AL/RE	F	5
C-5	1951-05086	AL/MV	MV/MV/WH	F	2
C-5	1581-66266	LB/WH/LB	RE/AL	F	1
C-5	1581-66257	LB/WH/LB	AL/RE	M	2
C-5	1581-66278	LB/WH/LB	OR/AL	F	0
C-5	1581-66220	WH/LB/WH	PU/AL	M	7
C-6	1581-66263	DB/RE/DB	AL/PU	F	2
C-7	951-26305	AL/YE	YE/YE/WH	M	4
C-7	1581-66238	WH/LB/WH	AL/PU	F	4
C-7	1581-66273	WH/RE/WH	AL/WH		
C-7	1581-66274	WH/RE/WH	AL/DB		

Table 2 continued

Roost Cluster	FWS	Left Leg	Right Leg	Sex	Age
C-8	1581-66251	LB/WH/LB	AL/DB	M	3
C-8	1581-66279	YE/DB/YE	AL/RE	F	0
C-8	1581-66280	YE/DB/YE	AL/YE	M	0
C-8	1841-53714	RE/YE/RE	AL/OR	F	1
C-10	941-92233	AL / ST	WH/WH/LG	F	3
C-10	1581-66281	OR/OR/OR	YE/AL	F	0

*one bird in the C-3 clan was roosting in the nearby C-4 cluster

Breeding Observations

Active clusters were monitored for evidence of breeding activity. Six successful breeding attempts were documented during the 2007 season at C-1, C-3, C-5, C-7, C-8, and C-10, producing a combined total of 9 chicks to fledging age. This was the first year that a pair attempted breeding at Cluster 8.

Cluster 1 – A new breeding male (AL/OR, DB/DB/WH) assumed reproductive duties for the first time since 2003. The breeding female (WH/LB/WH, AL/YE) has been the same individual since 2003. The former breeding male (DG/YE/DG, RE/AL) was not detected in 2007. The new breeding male was translocated from Carolina Sandhills NWR in 2002. A full clutch of 3 eggs were first observed in cavity tree #39 on 10 May. Two eggs did not hatch and a single nestling was banded as a 7-8 d chick on 19 May. This nestling successfully fledged and was determined to be a female by plumage on 16 June. The fledged bird was seen again at C-1 during the winter survey.

Cluster 3 – The breeding pair within cluster 3 was the same as it was in 2005. The breeding female (BK/YE/DB, RE/AL) was moved to Piney Grove in 2002 from Gates County, NC. The breeding male (RE/DB, WH/AL) was banded as a nestling in C-3 in 2000. This pair used a cavity in tree # 8 to breed for the second consecutive year. These birds previously nested in tree #3 until 2006 after it was taken over by White-breasted Nuthatches. This cavity was too high to be examined with the peeper scope. Incubation behavior was first observed on 15 May. A bird approached the cavity with food on 22 May. A single 8-d old chick was banded on 27 May (Table 3). One unhatched egg was also observed in the nest. The chick fledged successfully and was determined to be a female by plumage on 24 June. The fledging was not resighted during winter surveys. Incubation of the eggs was also aided by a helper bird believed to be a female (LB/WH/LB, R/AL) that was also located helping in incubation duties at C-5 this same season. This exact roosting location of this bird was not determined until winter but seen entering the nest cavity of C-3 to incubate within minutes after the clan of birds first emerged after dawn. Incubation at C-5 by this bird was only observed in later morning hours (mostly after 0900).

Cluster 5 – A new breeding pair assumed reproductive duties in C-5 in 2007. The new breeding male (WH/LB/WH, PU/AL) was banded as a nestling in 2000 at C-5. It replaced the breeding male (WH/LB/WH, PK2/AL) from 2006. This was the second

consecutive year a new male assumed breeding responsibilities at this cluster. The 2006 breeding male was not seen in 2007 nor was the 2005 breeding male. The new breeding female (AL/MV, MV/MV/WH) was translocated to Piney Grove from Carolina Sandhills, NWR in 2005. The former breeding female (WH/LB/WH, WH/AL) was not seen in 2007, although had been breeding there since 2000 and originally banded as and adult at C-5 in 1998. The pair used a new tree, # 26, for nesting within a cavity that was too high to use the peeper scope. Incubation was detected for the first time on 15 May when the breeding female left the cavity and was replaced by another female (LB/WH/LB, RE/AL). This helper female was also observed incubating at C-3. The nightly roosting location of this helper was not identified. The breeding male of C-5 was observed incubating on several other occasions. Adult birds were first observed bringing food to the nest on 19 May. Two 5-6 d old chicks were banded on 28 May. Both nestlings successfully fledged and were each identified as females on 12 June. Both of these birds were resighted during the winter survey.

Cluster 7 – The breeding male (AL/YE, YE/YE/WH) was the same as in 2005. This bird was translocated to cluster 7 from Carolina Sandhills, NWR in 2003 and has been present within this cluster since that time. It is the only male to breed at this cluster. A new breeding female (WH/LB/WH, AL/PU) originally banded at C-5 as a nestling in 2003 replaced the 2006 breeding female (WH/RE/WH, AL/DG). A new cavity was excavated and used for nesting in tree # 108. This was the second consecutive year a cavity was excavated in a new tree and used for nesting. A full clutch of 4 eggs was first observed on 2 May. During a following visit on 10 May only 3 eggs were remaining in the nest and one nestling was hatching. Two nestlings were banded on 19 May. The third egg was not in the nest and its fate is unknown. The 2 nestlings successfully fledged and were both identified as males on 14 June. Both fledglings were resighted during winter surveys.

Cluster 8 – This was the first year breeding was attempt at C-8. The breeding pair was composed of a male (DB/RE/DB, AL/RE) originally banded as a nestling at C-3 in 2004 and a female (DG/YE/DG) originally banded as a nestling at C-1 in 2004. This was also the first time the breeding female was observed at Piney Grove since the fall of 2004. This female was not detected during the spring survey of 2007 and was not seen during the winter survey. A full clutch of 3 eggs was found in tree # 174on 10 May. On 23 May, two chicks were seen but there was no sign of the third egg. The two nestlings were banded on 28 May and estimated to be 8 d old. The 2 nestlings were observed to successfully fledge on 23 June and identified as being one male and one female by plumage. Both fledglings were resighted during winter surveys.

Cluster 10 – This was the second year that birds successfully fledged young at this cluster. The 2007 breeding male (WH/RE/WH, AL/DG) was born in C-7 in 2005 and replaced the 2006 breeding male (AL/YE, DG/DG/MV) that was translocated to Piney Grove from Carolina Sandhills, NWR in the fall of 2003. The breeding female (AL/ST, WH/WH/LG) remained the same from 2006. It was originally translocated to Piney Grove from Carolina Sandhills, NWR in the fall of 2005. The nest cavity was in the artificial insert in tree #64. Two eggs were observed in the cavity for the first time on 16 May. Two young were observed on 26 May. Nestlings were estimated as 0-1 d of age. Only one nestling was

observed in the nest at the time of banding on 7 June. This bird successfully fledged and was identified as a female on 26 June. This fledgling was resighted during winter surveys.

Table 3. Red-cockaded Woodpecker nestlings banded in 2007 on Piney Grove Preserve.

Cluster	Date	FWS	Lft	Rt	Age	Wgt (g)	Sex
1	5/27/07	1581-66276	DG/YE/DG	OR/AL	7-8	25.5	F
3	5/27/07	1581-66275	OR/AL	DB/RE/DB	8	33.0	F
5	5/28/07	1581-66277	LB/WH/LB	YE/AL	5-6	18.0	F
5	5/28/07	1581-66278	LB/WH/LB	OR/AL	6	20.0	F
7	5/19/07	1581-66273	WH/RE/WH	AL/WH	8	25.5	M
7	5/19/07	1581-66274	WH/RE/WH	AL/DB	7	19.5	M
8	5/28/07	1581-66279	YE/DB/YE	AL/RE	8	31.5	F
8	5/28/07	1581-66280	YE/DB/YE	AL/YE	8	24.5	M
10	6/8/07	1581-66281	OR/OR/OR	YE/AL	8-9	32.5	F

Translocations

No translocations were made during 2007. A decision was made not to introduce new birds into Piney Grove based on good reproduction and the perception that many birds were exploring recruitment clusters and apparently foraging and settling in new areas.

Immigrant Red-cockaded Woodpecker from North Carolina

On 6 December, the winter survey crew found a bird roosting in C-8 with an unknown color band combination (RE/YE/RE, AL/OR). We first assumed this bird came from a local source so contacted J. Carter and Associates because they color band and monitor Red-cockaded Woodpecker populations in several locations in North Carolina. They replied with a positive identification on the band combination and the corresponding band number on the USFWS aluminum band. We captured the bird on 11 December and verified it was the same individual banded by J. Carter and Associates as a 10-day old nestling in 2006, then later identified as a female at the Peartree-Palmetto Preserve in Tyrell County, North Carolina. The natal site is managed by the Peartree-Palmetto Preserve Conservation Fund, in partnership with the North Carolina Department of Transportation, as a RCW mitigation bank to compensate for RCW habitat loss from new roadway construction. This site is approximately 80 miles (128km) from Piney Grove.

Cavity Trees

In 2007, Piney Grove contained 118 cavities in live trees including 25 start cavities, 35 completed cavities, and 58 artificial inserts (Appendix I). Two trees, one with a completed natural cavity and one with an insert, died at the beginning of 2007 and were not counted as available. Another tree with a completed natural cavity died in August 2007 reducing the number of available cavities to 117. Of the 93 available natural cavities or inserts, 28 had fresh or recent chipping and sap flow from resin wells in 2007 (Appendix II). Twenty-three available natural cavities or inserts had fresh or recent chipping and sap flow from resin wells in December 2007 (Table 4). Of the 58 inserts in live trees, 7 (12%) had fresh or recent resin work. Of the 36 natural cavities, 21 (58%) had fresh or recent resin work.

Nine new cavities were added in 2007 (Table 5). One new completed natural cavity tree with three new cavity starts at C8; one new start in a new tree at C1; and four new inserts in a new cluster area (C15). The tree at C8 is an existing non-RCW cavity being used as a temporary roost. Cluster C15 was installed in the fall of 2007. Trees 38, 39 and 45 at C1 received crown scorch during a prescribed burn in June 2007. By August 2007, tree 38, the nest tree from C1, was dead with beetles noted at the base. Cluster 5 lost two trees early in 2007: Tree 138, with an artificial insert, was struck by lightning during a storm in November 2006 and died early in 2007; and Tree 93 was broken at the cavity prior to March 2007. These two trees were not counted as available for 2007.

Table 4. Active Red-cockaded Woodpecker cavity counts in each cluster area on Piney Grove Preserve in December 2007.

Cluster area	Artificial insert	Completed natural cavity	Start cavity
C-1	0	3	4
C-2	0	0	0
C-3	0	2	3
C-4	1	0	0
C-5	0	4	1
C-6	1	0	2
C-7	2	2	0
C-8	3	2	0
C-9	0	0	0
C-10	2	0	0
C-11	0	0	0
C-12	0	0	0
C-13	0	0	0
C-14	0	1	2

Table 5. Red-cockaded Woodpecker cavity changes in each cluster area on Piney Grove Preserve during 2007.

Cluster area	Tree tag number	New Found or Died	Cavity condition	2007Activity status
C-15	160	New	Artificial Insert	Inactive
C-15	161	New	Artificial Insert	Inactive
C-15	162	New	Artificial Insert	Inactive
C-15	163	New	Artificial Insert	Inactive
C-1	58	Found	Start (Advanced)	Active
C-8	NT	Found	Natural Complete	Active
C-8	NT	Found	Start (Advanced)	Active
C-8	NT	Found	Start	Active
C-8	NT	Found	Start	Active
C-1	38	Died	Natural Complete	Active
C-5	138	Died	Artificial Insert	Inactive
C-5	93	Died	Natural Complete	Inactive

Cavity competitor inspection and removal— There were 32 instances of cavity competitors in RCW cavities during the 2007 calendar year (Table 6). Multiple cavity competitors occurring simultaneously in a cavity were counted as separate occurrences. Multiple individuals of one species found together in a cavity were counted as one occurrence. Southern flying squirrels accounted for 20 of the 32 occurrences (62%). A total of 28 individual flying squirrels were removed on 20 occasions from 13 of the 92 available cavity trees. About one third (30%) of available RCW cavities contained occupants in 2007 (Appendix III). Of the 20 occurrences of flying squirrels, six (36%) occurred in three of the four inserts in cluster C-9 (Table 7). Clusters C-9, C-10 and C-14 combined had 13 of the 20 occurrences (65%). Ninety five percent of the squirrels and 87% of all non-RCW occupants were found in artificial inserts.

Table 6. Red-cockaded Woodpecker cavity competitor occurrences on Piney Grove Preserve in 2007.

Cavity Occupant	Number of cavities	Number of occurrences
Southern Flying Squirrels removed	13	20
Flying squirrel and nest material	17	25
Tufted Titmouse	1	1
White-breasted nuthatch	3	3
Rat Snake	2	2
Gray Tree frog	1	1
Bumblebee species	0	0

Table 7. Number of Southern flying squirrels found in Red-cockaded woodpecker cavity trees on Piney Grove Preserve in 2007.

Cluster area	Number of available cavities	Southern flying squirrels removed	Occurrences of flying squirrels	Average occurrence per cavity tree (OTC)
9	4	8	6	1.5
10	5	6	4	0.80
14	4	4	3	0.75
3	11	4	2	0.18
5	12	2	2	0.16
13	7	2	1	0.14
1	15	2	2	0.13
4	3	0	0	0.00
6	5	0	0	0.00
7	6	0	0	0.00
8	6	0	0	0.00
11	4	0	0	0.00
12	4	0	0	0.00
2	3	Not checked	Not checked	N/A

Historic Sites

Historic sites were not visited this season since most have been degraded and no longer have the potential to support RCWs. Descriptions of each site are based on 2006 visits.

Route 460 Site (Sussex County)

Site Condition – This site remains intact but is severely degraded from midstory encroachment and limited size. Habitat on both sides of this tract has been harvested in the last 20 years leaving this island of mature timber too insignificant to consider for management purposes.

Cavity tree status – None detected.

Bird status – No evidence of activity present.

Route 35 Site (Southampton County)

Site Condition – The site was purchased by Ashton Lewis Lumber Company in late 2001 and harvested in fall 2002. Remaining timber on this tract is relegated to two small stands (less than 20 ha each) primarily in the 40 -60 year age class. Next nearest stand of mature timber is a small 15 ha block approx. 3 km away.

Cavity tree status – All were harvested or knocked down in the harvest.

Bird status – No recent evidence of birds.

Route 612 Site (Southampton County)

Site Condition – With the exception of 135 acres that surrounds the cluster area, this site was harvested in the summer of 2003 by Virginia-Carolina Properties. Harvest was carried out under agreement with the Virginia Department of Game & Inland Fisheries and the U.S. Fish and Wildlife Service. Under a Habitat Conservation Plan developed in cooperation with the U.S. Fish and Wildlife Service, the Virginia Department of Game & Inland Fisheries, The Nature Conservancy, and the Center for Conservation Biology, the lone, male Red-cockaded Woodpecker was moved to the Piney Grove Preserve and the remaining 135 acres were harvested in the late spring of 2005.

Rt. 40 Site (Sussex County)

Site Condition – The core site between Rt 40 and old Rt 40 is still intact, although hardwood encroachment and a dense pine subcanopy have all but removed access to any potential cavity trees. Ashton Lewis Lumber Company purchased this site from Gray Family Trust in 2002. They have since harvested all of the mature timber around this site, leaving only the historic triangle of old-growth timber still standing. This remaining tract is less than 25 ha and is too degraded to be of any use to red-cockaded woodpeckers. Ashton Lewis has received authority to harvest the remaining acreage as soon as the site dries out enough to get equipment in.

Cavity tree status – All historic cavity trees are dead or have been enlarged to the point of excluding red-cockaded as users.

Bird status – Last detection was a vocalizing bird to the southeast of the stand in spring, 1996.

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Appendix I. Status of Red-cockaded Woodpecker cavities on Piney Grove in 2007.

Cluster	Tree	Species	Condition	Cavity	Status	Entrance	Plate	Resin Work
1	35	Loblolly	Live	Natural	Start (Ad)	Normal	Unstarted	Recent
1	36	Loblolly	Live	Artificial	Insert	Normal	>15 cm	Old
1	37	Loblolly	Live	Natural	Start	Normal	Unstarted	Recent
1	38	Shortleaf	Dead	Natural	Complete	Normal	30-45 cm	Fresh
1	39	Loblolly	Live	Natural	Complete	Normal	> 45 cm	Fresh
1	40	Loblolly	Dead	Natural	Complete	Unavailable	Unavailable	Unavailable
1	41	Loblolly	Dead	Natural	Complete	Unavailable	Unavailable	Unavailable
1	42	Loblolly	Live	Natural	Start	Healing	Unavailable	Unavailable
1	43	Loblolly	Live	Natural	Complete	>4X	15-30 cm	Old
1	44	Loblolly	Live	Natural	Complete	>4X	15-30 cm	Old
1	45	Loblolly	Live	Natural	Complete	Normal	30-45 cm	Fresh
1	46	Loblolly	Live	Natural	Complete	<2X	>15 cm	Old
1	47	Loblolly	Live	Natural	Start (Ad)	Restrictor	Unstarted	Recent
1	48	Loblolly	Live	Natural	Complete	Normal	> 45 cm	Fresh
1	49	Loblolly	Live	Natural	Complete	>4X	15-30 cm	Old
1	50	Shortleaf	Dead	Artificial	Insert	Unavailable	Unavailable	Unavailable
1	51	Loblolly	Dead	Artificial	Insert	Unavailable	Unavailable	Unavailable
1	52	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
1	53	Loblolly	Live	Natural	Complete	<2X	>15 cm	Fresh
1	54	Loblolly	Live	Natural	Start	Normal	Unstarted	Fresh
1	55	Loblolly	Live	Natural	Complete	<2X	Unstarted	Fresh
1	57	Loblolly	Live	Natural	Complete	Normal	Unstarted	Fresh
1	58	Unknown	Live	Natural	Start (Ad)	Normal	Unstarted	Fresh
1	102	Loblolly	Live	Natural	Complete	<2X	>15 cm	Old
1	117	Loblolly	Live	Artificial	Insert	Normal	>15 cm	Old
2	60	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
2	61	Loblolly	Dead	Artificial	Insert	Unavailable	Unavailable	Unavailable
2	62	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
2	63	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
3	1	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Recent
3	2	Loblolly	Live	Artificial	Insert	Restrictor	>15 cm	Old
3	4	Loblolly	Live	Natural	Complete	Restrictor	30-45 cm	Recent
3	5	Loblolly	Live	Natural	Start	Normal	Unstarted	Old
3	6	Loblolly	Live	Natural	Complete	<2X	Unstarted	Old
3	7	Loblolly	Live	Natural	Start (Ad)	Normal	Unstarted	Fresh
3	8	Loblolly	Live	Natural	Complete	<2X	>15 cm	Fresh
3	71	Loblolly	Dead	Natural	Complete	Unavailable	Unavailable	Unavailable
3	72	Loblolly	Live	Natural	Complete	>4X	>15 cm	Old
3	74	Loblolly	Dead	Natural	Complete	Unavailable	Unavailable	Unavailable
3	75	Loblolly	Live	Natural	Complete	>4X	>15 cm	Old
3	76	Loblolly	Live	Artificial	Insert	Normal	>15 cm	Old
3	77	Loblolly	Dead	Natural	Complete	Unavailable	Unavailable	Unavailable
3	80	Loblolly	Live	Natural	Start (Ad)	Normal	Unstarted	Fresh
3	177	Loblolly	Live	Artificial	Insert	Normal	>15 cm	Old
3	178	Loblolly	Live	Natural	Start	<2X	Unstarted	Recent
3	3a	Loblolly	Live	Natural	Complete	Restrictor	15-30 cm	Fresh
3	3b	Loblolly	Live	Natural	Start	Normal	Unstarted	Old
3	79a	Loblolly	Live	Natural	Complete	<2X	30-45 cm	Old
3	79b	Loblolly	Live	Natural	Start	Normal	Unstarted	Fresh
3	79c	Loblolly	Live	Natural	Start	Restrictor	Unstarted	Old
3	9a	Loblolly	Live	Natural	Start	<2X	Unstarted	Old
3	9b	Loblolly	Live	Natural	Start (Ad)	Normal	Unstarted	Fresh
3	9c	Loblolly	Live	Natural	Start	Normal	Unstarted	Old
4	81	Loblolly	Dead	Artificial	Insert	Unavailable	Unavailable	Unavailable
4	82	Loblolly	Live	Artificial	Insert	Normal	>15 cm	Fresh
4	83	Loblolly	Dead	Artificial	Insert	Unavailable	Unavailable	Unavailable
4	84	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old

Appendix I. Continued –

Cluster	Tree	Species	Condition	Cavity	Status	Entrance	Plate	Resin Work
4	186	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
5	20	Loblolly	Live	Natural	Complete	Restrictor	> 45 cm	Old
5	21	Loblolly	Dead	Natural	Complete	Unavailable	Unavailable	Unavailable
5	22	Loblolly	Live	Natural	Complete	Normal	> 45 cm	Old
5	23	Loblolly	Live	Natural	Complete	Restrictor	> 45 cm	Fresh
5	24	Loblolly	Live	Natural	Complete	<2X	>15 cm	Fresh
5	25	Loblolly	Live	Natural	Complete	Normal	15-30 cm	Fresh
5	26	Loblolly	Live	Natural	Complete	Normal	>15 cm	Fresh
5	27	Loblolly	Live	Natural	Complete	<2X	>15 cm	Fresh
5	28	Loblolly	Live	Natural	Complete	Normal	>15 cm	Recent
5	29	Loblolly	Dead	Natural	Complete	Unavailable	Unavailable	Unavailable
5	30	Unknown	Live	Natural	Start (Ad)	Normal	Unstarted	Recent
5	92	Loblolly	Live	Natural	Start	Normal	Unstarted	Old
5	93	Loblolly	Dead	Natural	Complete	Normal	30-45 cm	Recent
5	94	Loblolly	Live	Natural	Complete	Restrictor	>15 cm	Old
5	95	Loblolly	Live	Natural	Complete	Restrictor	15-30 cm	Old
5	96	Loblolly	Dead	Natural	Complete	Unavailable	Unavailable	Unavailable
5	97	Loblolly	Dead	Natural	Complete	Unavailable	Unavailable	Unavailable
5	98	Loblolly	Dead	Natural	Complete	Unavailable	Unavailable	Unavailable
5	99	Loblolly	Dead	Natural	Complete	Unavailable	Unavailable	Unavailable
5	127	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
5	138	Loblolly	Dead	Artificial	Insert	Unavailable	Unavailable	Unavailable
5	191	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
6	10	Loblolly	Live	Artificial	Insert	Normal	>15 cm	Old
6	11	Loblolly	Dead	Artificial	Insert	Unavailable	Unavailable	Unavailable
6	12	Loblolly	Dead	Artificial	Insert	Unavailable	Unavailable	Unavailable
6	13	Loblolly	Dead	Artificial	Insert	Unavailable	Unavailable	Unavailable
6	116	Loblolly	Live	Artificial	Insert	Normal	>15 cm	Old
6	135	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Recent
6	137	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
6	139	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Fresh
6	136a	Loblolly	Live	Natural	Start	Normal	Unstarted	Fresh
6	136b	Loblolly	Live	Natural	Start	Normal	Unstarted	Fresh
7	105	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Fresh
7	106	Loblolly	Live	Natural	Complete	<2X	>15 cm	Fresh
7	110	Loblolly	Live	Artificial	Insert	Normal	>15 cm	Recent
7	111	Loblolly	Live	Artificial	Insert	Normal	>15 cm	Fresh
7	112	Loblolly	Dead	Artificial	Insert	Unavailable	Unavailable	Unavailable
7	113	Loblolly	Dead	Artificial	Insert	Unavailable	Unavailable	Unavailable
7	114	Loblolly	Dead	Artificial	Insert	Unavailable	Unavailable	Unavailable
7	115	Loblolly	Live	Natural	Complete	<2X	30-45 cm	Fresh
7	195	Loblolly	Live	Artificial	Insert	Normal	>15 cm	Old
8	170	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
8	171	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
8	172	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
8	173	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
8	174	Loblolly	Live	Natural	Complete	Restrictor	Unstarted	Fresh
8	Nta	Unknown	Live	Natural	Start (Ad)	Normal	Unstarted	Old
8	NTb	Unknown	Live	Natural	Complete	<2X	Unstarted	Old
8	NTc	Unknown	Live	Natural	Start	Normal	Unstarted	Recent
8	NTd	Unknown	Live	Natural	Start	Normal	Unstarted	Recent
9	85	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
9	86	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Recent
9	87	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
9	88	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
10	64	Loblolly	Live	Artificial	Insert	Normal	>15 cm	Fresh
10	65	Loblolly	Live	Artificial	Insert	Normal	30-45 cm	Fresh
10	66	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
10	67	Unknown	Live	Natural	Complete	>2X	Unstarted	Old
10	150	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old

Appendix I. Continued –

Cluster	Tree	Species	Condition	Cavity	Status	Entrance	Plate	Resin Work
10	151	Loblolly	Dead	Artificial	Insert	Unavailable	Unavailable	Unavailable
10	152	Loblolly	Dead	Artificial	Insert	Unavailable	Unavailable	Unavailable
10	153	Loblolly	Dead	Artificial	Insert	Unavailable	Unavailable	Unavailable
11	140	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
11	141	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
11	142	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
11	143	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
12	130	Loblolly	Dead	Artificial	Insert	Unavailable	Unavailable	Unavailable
12	131	Loblolly	Live	Artificial	Insert	<2X	Unstarted	Old
12	132	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
12	133	Loblolly	Live	Artificial	Insert	<2X	Unstarted	Old
12	189	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
13	118	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
13	119	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
13	120	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
13	121	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
13	122	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
13	123	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
13	124	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
14	88	Unknown	Live	Natural	Start (Ad)	Normal	Unstarted	Recent
14	89	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
14	90	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
14	91	Loblolly	Live	Artificial	Insert	Normal	Unstarted	Old
14	100	Loblolly	Live	Natural	Start	Normal	Unstarted	Old
14	101	Loblolly	Live	Natural	Complete	Normal	Unstarted	Recent
15	160	Unknown	Live	Artificial	Insert	Normal	Unstarted	Old
15	161	Unknown	Live	Artificial	Insert	Normal	Unstarted	Old
15	162	Unknown	Live	Artificial	Insert	Normal	Unstarted	Old
15	163	Unknown	Live	Artificial	Insert	Normal	Unstarted	Old

Appendix II. Characteristics of Red-cockaded Woodpecker cavities on Piney Grove in 2007.

Cluster	Tree	Species	Condition	Direction	Height (feet)	Cavity Stage	Enlargement	Activity	Depth (inches)	Plate	Chipping	Dry Sap	Fresh Sap	*Comments*	Needs face repair	Needs major repair
1	**35**	Loblolly	Live	247	44	3	1	1	6+	5	3	3	4	6/12/07 Area recently burned		
1	**36**	Loblolly	Live	207	32	6	1	3		4	4	3	4	6/12/07 Area recently burned	X	
1	**37**	Loblolly	Live	242	52	4	1	1	3	5	3	3	4	6/12/07 Area recently burned		
1	**38**	Shortleaf	Dead	152	32.5	1	1	1		2	2	2	2	6/12/07 Area recently burned; 80% crown scorch; 8/15/07 Dead standing; beetles in base		
1	**39**	Loblolly	Live	150	32	1	1	1		1	2	2	2	6/12/07 Area recently burned; 15% crown scorch		
1	**40**	Loblolly	Dead			1								Broke/standing; 6/12/07 Area recently burned		
1	**41**	Loblolly	Dead			1								Standing – Broke; 6/12/07 Area recently burned		
1	**42**	Loblolly	Live	?	?	4	H							About 10 holes in tree healing or healed – Red heart fruiting body; 6/12/07 Area recently burned		
1	**43**	Loblolly	Live	277	35	1	4	4		3	4	3	4	4/22/07 tree is leaning; 6/12/07 Area recently burned		
1	**44**	Loblolly	Live	295	35	1	4	4		3	4	3	4	6/12/07 Area recently burned		
1	**45**	Loblolly	Live	83	25	1	1	1		2	2	2	2	3/28/07 Red heart fruiting body; 6/12/07 Area recently burned; 50% crown scorch		
1	**46**	Loblolly	Live	226	63	1	2	4		4	4	3	4	6/12/07 Area recently burned		
1	**47**	Loblolly	Live	251	57	3	R	1	4	5	3	3	3	6/12/07 Area recently burned; 1/29/08 top broke at ~80'; still has live limbs below break		
1	**48**	Loblolly	Live	249	34	1	1	1		1	2	2	2	6/12/07 Area recently burned		
1	**49**	Loblolly	Live	260	55	1	4	4		3	4	3	4	6/12/07 Area recently burned		
1	**50**	Shortleaf	Dead			6								Fallen		
1	**51**	Loblolly	Dead	282	39	6								Standing – Broke; 6/12/07 Area recently burned		
1	**52**	Loblolly	Live	300	35	6	1	4		5	4	4	4	6/12/07 Area recently burned		
1	**53**	Loblolly	Live	292	46.5	1	2	1		4	2	2	2	6/12/07 Area recently burned		
1	**54**	Loblolly	Live	247	29	4	1	1	2	5	2	3	3	6/12/07 Area recently burned		
1	**55**	Loblolly	Live	347	50	1	2	1		5	2	3	2	6/12/07 Area recently burned		
1	**57**	Loblolly	Live	259	49	1	1	1		5	2	2	2	1/29/08 No paint; 6/12/07 Area recently burned; 90% crown scorch		
1	**102**	Loblolly	Live	264	55	1	2	4		4	4	2	4	Tree leaning at 80 degree onto another tree; 6/12/07 Area recently burned		
1	**117**	Loblolly	Live	221	32	6	1	3		4	4	3	4	6/12/07 Area recently burned	X	
1	**58**	Unknown	Live	320	39	3	1	1	5	5	1	3	3	Base scar at 3' & 7'; 4/22/07 White Paint; 6/12/07 Area recently burned		
2	**60**	Loblolly	Live	252	34	6	1	4		5	4	4	4		X	
2	**61**	Loblolly	Dead			6								Not Found	X	
2	**62**	Loblolly	Live	290	35	6	1	4		5	4	3	4		X	
2	**63**	Loblolly	Live	283	33	6	1	4		5	4	3	4		X	
3	**1**	Loblolly	Live	234	31	6	1	3		5	3	2	4	4/13/07 Area recently burned		
3	**2**	Loblolly	Live	230	32	6	R	3		4	4	2	4	4/13/07 Area recently burned		
3	**4**	Loblolly	Live	255	44	1	R	1		2	3	2	3	4/13/07 Area recently burned		
3	**5**	Loblolly	Live	170	40	4	1	4	3	5	4	4	4	4/13/07 Area recently burned; fungus growth around entrance		
3	**6**	Loblolly	Live	262	58	1	2	3		5	4	2	4	4/13/07 Area recently burned		
3	**7**	Loblolly	Live	287	36	3	1	1	5+	5	1	3	3	9/29/06 needs paint (has one band on south side only); 4/13/07 Area recently burned		
3	**8**	Loblolly	Live	258	56	1	2	1		4	2	2	2	4/13/07 Area recently burned		
3	**71**	Loblolly	Dead	224	45	1								Standing – Broke at cavity; 4/13/07 Area recently burned		
3	**72**	Loblolly	Live	217	45	1	4	4		4	4	3	4	4/13/07 Area recently burned		
3	**74**	Loblolly	Dead			1								4/13/07 Area recently burned; tree burned to stump; no tag		
3	**75**	Loblolly	Live	255	50	1	4	4		4	4	2	4	4/13/07 Area recently burned		
3	**76**	Loblolly	Live	306	31.5	6	1	3		4	4	3	4	4/13/07 Area recently burned; 7/26/07 tree became active		
3	**77**	Loblolly	Dead			1								Standing/broke at cavity; 4/13/07 Area recently burned		
3	**80**	Loblolly	Live	302	30	3	1	1	5	5	1	3	3	4/13/07 Area recently burned		
3	**177**	Loblolly	Live	251	30	6	1	3		4	4	3	4	4/13/07 Area recently burned	X	

Appendix II. Continued –

Cluster	Tree	Species	Condition	Direction	Height (feet)	Cavity Stage	Enlargement	Activity	Depth (inches)	Plate	Chipping	Dry Sap	Fresh Sap	Comments	Needs face repair	Needs major repair
3	**178**	Loblolly	Live	233	30	4	2	1	4	5	3	3	3	4/13/07 Area recently burned		
3	**3a**	Loblolly	Live	250	27	1	R	1		3	2	2	2	4/13/07 Area recently burned		
3	**3b**	Loblolly	Live	28	23	4	1	3	1	5	4	3	4	4/13/07 Area recently burned		
3	**79a**	Loblolly	Live	238	50	1	2	4		2	4	2	4	4/13/07 Area recently burned		
3	**79b**	Loblolly	Live	72	50	4	1	1	4	5	2	3	3	4/13/07 Area recently burned		
3	**79c**	Loblolly	Live	272	33	4	R	3	4	5	4	4	4	4/13/07 Area recently burned		
3	**9a**	Loblolly	Live	303	58	4	2	4		5	4	4	4	4/13/07 Area recently burned		
3	**9b**	Loblolly	Live	343	50	3	1	1	5+	5	1	3	3	4/13/07 Area recently burned		
3	**9c**	Loblolly	Live	224	49	4	1	3	3	5	4	4	4	other holes at 248 deg. 41' 230 deg. 42' and others healed		
4	**81**	Loblolly	Dead			6								Fallen – wind throw		
4	**82**	Loblolly	Live	240	31.5	6	1	1		4	2	2	2			
4	**83**	Loblolly	Dead	270	32	6								Standing		
4	**84**	Loblolly	Live	250	33	6	1	4		5	4	4	4	Tree healing around insert		
4	**186**	Loblolly	Live	230	31.5	6	1	4		5	4	4	4			
5	**20**	Loblolly	Live	230	51	1	R	3		1	4	2	4	3/27/07 Area recently burned		
5	**21**	Loblolly	Dead	283	41	1								11/4/06 Dead/broke at cavity; 3/27/07 Area recently burned		
5	**22**	Loblolly	Live	296	52	1	1	3		1	4	2	4	3/27/07 Area recently burned		
5	**23**	Loblolly	Live	325	49.5	1	R	1		1	2	2	2	3/27/07 Area recently burned		
5	**24**	Loblolly	Live	365	55	1	2	1		4	2	1	2	Many Pileated WP holes below cavity, possibly hollow, Red heart fruiting body; 3/26/07 Restrictor		
5	**25**	Loblolly	Live	273	37.5	1	1	1		3	2	2	2	3/27/07 Area recently burned		
5	**26**	Loblolly	Live	200	50	1	1	1		4	2	2	2	3/27/07 Area recently burned		
5	**27**	Loblolly	Live	247	24	1	2	1		4	2	2	2	3/27/07 Area recently burned		
5	**28**	Loblolly	Live	280	42	1	1	1		4	3	2	3	3/27/07 Area recently burned		
5	**29**	Loblolly	Dead			1								Standing – top broke off at ~70'; Red heart fruiting body; 3/27/07 Area recently burned		
5	**30**	Unknown	Live	280	31	3	1	1	5	5	3	3	3	3/27/07 Area recently burned		
5	**92**	Loblolly	Live	290	30	4	1	4	2	5	4	3	4	3/27/07 Area recently burned; 4/22/07 Healing over entrance		
5	**93**	Loblolly	Dead	310	55	1	1	3		2	3	2	3	3/27/07 Area recently burned; Dead/Broke at cavity from tropical storm		
5	**94**	Loblolly	Live	304	50	1	R	3		4	4	3	4	3/27/07 Area recently burned		
5	**95**	Loblolly	Live	14	42	1	R	4		3	4	3	4	3/27/07 Area recently burned		
5	**96**	Loblolly	Dead			1								Standing – Broke at cavity; 4/13/07 Area recently burned		
5	**97**	Loblolly	Dead			1								Standing – Broke at cavity; 4/13/07 Area recently burned		
5	**98**	Loblolly	Dead	206	45	1								Standing; 3/27/07 Area recently burned		
5	**99**	Loblolly	Dead	300	45	1								Standing; 3/27/07 Area recently burned		
5	**127**	Loblolly	Live	270	32.5	6	1	4		5	4	4	4	3/27/07 Area recently burned	X	
5	**138**	Loblolly	Dead	320	32	6								11/4/06 Lightning strike and beetles; 4/22/07 Dead standing; 3/27/07 Area recently burned	X	
5	**191**	Loblolly	Live	322	32	6	1	4		5	4	3	4	3/27/07 Area recently burned	X	
6	**10**	Loblolly	Live	206	32	6	1	3		4	4	3	4	Insert opens into hollow center of tree	X	
6	**11**	Loblolly	Dead			6								Fallen – wind throw		
6	**12**	Loblolly	Dead			6								Standing – broke at cavity		
6	**13**	Loblolly	Dead			6								Not Found		
6	**116**	Loblolly	Live	170	31.5	6	1	3		4	4	3	4		X	
6	**135**	Loblolly	Live	195	34.5	6	1	3		5	3	3	4			X
6	**137**	Loblolly	Live	207	36	6	1	3		5	4	4	4		X	
6	**139**	Loblolly	Live	200	31.5	6	1	1		5	2	4	3		X	
6	**136a**	Loblolly	Live	166	48.5	4	1	1	1	5	2	3	3			
6	**136b**	Loblolly	Live	184	47	4	1	1	4	5	2	3	3			
7	**105**	Loblolly	Live	260	32.5	6	1	1		5	2	3	2	4/14/07 Area recently burned		
7	**106**	Loblolly	Live	280	36	1	2	1		4	2	2	2	9/29/06 Red Heart Fruiting Body; 4/14/07 Area recently burned		
7	**110**	Loblolly	Live	265	23	6	1	1		4	3	2	3	4/14/07 Area recently burned		

Appendix II. Continued –

Cluster	Tree	Species	Condition	Direction	Height (feet)	Cavity Stage	Enlargement	Activity	Depth (inches)	Plate	Chipping	Dry Sap	Fresh Sap	*Comments*	Needs face repair	Needs major repair
7	**111**	Loblolly	Live	286	22	6	1	1		4	2	2	2	4/14/07 Area recently burned		
7	**112**	Loblolly	Dead	253	32	6								Dead/Standing; 4/14/07 Area recently burned		
7	**113**	Loblolly	Dead			6								Standing – Broke at cavity; 4/14/07 Area recently burned		
7	**114**	Loblolly	Dead			6								Fallen – wind throw; 4/14/07 Area recently burned		
7	**115**	Loblolly	Live	274	45	1	2	1		2	2	2	2	4/14/07 Area recently burned		
7	**195**	Loblolly	Live	223	29	6	1	3		4	4	3	4	4/14/07 Area recently burned		
8	**170**	Loblolly	Live	314	33	6	1	3		5	4	3	4			
8	**171**	Loblolly	Live	287	33	6	1	3		5	4	3	4		X	X
8	**172**	Loblolly	Live	300	33	6	1	3		5	4	3	4			
8	**173**	Loblolly	Live	255	33	6	1	3		5	4	3	4			
8	**174**	Loblolly	Live	352	38.5	1	R	1		5	2	2	2	10/31/06 So. Pine beetle pitch tubes; 3/22/07 restrictor added		
8	**Nta**	Unknown	Live	N	44	3	1	1	5	5	4	4	4	10/11/07 Painted; Cavity origin does not appear to be RCW		
8	**NTb**	Unknown	Live	N	43	1	2	1		5	4	4	4	10/11/07 Painted; Cavity origin does not appear to be RCW; Possible roosting cavity		
8	**NTc**	Unknown	Live	SE	40	4	1	1	1	5	3	4	3	10/11/07 Painted;		
8	**NTd**	Unknown	Live	SW	40	4	1	1	1	5	3	4	3	10/11/07 Painted;		
9	**85**	Loblolly	Live	255	37	6	1	3		5	4	3	4	4/13/07 Area recently burned	X	
9	**86**	Loblolly	Live	262	39	6	1	3		5	3	3	4	4/13/07 Area recently burned		
9	**87**	Loblolly	Live	226	37	6	1	3		5	4	3	4	4/13/07 Area recently burned		
9	**88**	Loblolly	Live	230	39	6	1	3		5	4	3	4	4/13/07 Area recently burned	X	
10	**64**	Loblolly	Live	241	34.5	6	1	1		4	2	2	2	12/05/07 recent under story reduction		
10	**65**	Loblolly	Live	296	36	6	1	1		2	2	2	2	12/05/07 recent under story reduction	X	
10	**66**	Loblolly	Live	266	33	6	1	3		5	4	3	4	Pileated damage; 12/05/07 recent under story reduction	X	
10	**67**	Unknown	Live	305	46	1	3	3		5	4	3	4	12/05/07 recent under story reduction		
10	**150**	Loblolly	Live	250	32	6	1	3		5	4	3	4	Pileated damage, 10/31/06 Insert replaced; 12/05/07 recent under story reduction		
10	**151**	Loblolly	Dead			6								Standing – Broke at cavity;		
10	**152**	Loblolly	Dead			6								Standing – Broke at cavity;		
10	**153**	Loblolly	Dead			6								Standing – Broke at cavity		
11	**140**	Loblolly	Live	195	31	6	1	3		5	4	3	4			
11	**141**	Loblolly	Live	202	31	6	1	3		5	4	3	4			
11	**142**	Loblolly	Live	264	31	6	1	3		5	4	4	4		X	
11	**143**	Loblolly	Live	220	31	6	1	3		5	4	4	4			
12	**130**	Loblolly	Dead			6								Fallen – wind throw		
12	**131**	Loblolly	Live	320	23	6	2	4		5	4	4	4	4/22/07 Metal front of insert box exposed completely		X
12	**132**	Loblolly	Live	305	33	6	1	4		5	4	4	4			X
12	**133**	Loblolly	Live	280	33	6	2	4		5	4	4	4	4/22/07 Metal front of insert box exposed completely		X
12	**189**	Loblolly	Live	253	31	6	1	4		5	4	4	4			X
13	**118**	Loblolly	Live	212	37	6	1	3		5	4	4	4		X	
13	**119**	Loblolly	Live	240	36	6	1	3		5	4	4	4		X	
13	**120**	Loblolly	Live	250	36	6	1	3		5	4	4	4		X	
13	**121**	Loblolly	Live	210	32	6	1	3		5	4	4	4			
13	**122**	Loblolly	Live	260	22	6	1	3		5	4	4	4			
13	**123**	Loblolly	Live	239	32.5	6	1	3		5	4	4	4			
13	**124**	Loblolly	Live		32.5	6	1	3		5	4	4	4		X	
14	**88**	Unknown	Live	294	40	3	1	1	5	5	3	3	3	3/21/07 need re-tag #, double tagged w/ C9		
14	**89**	Loblolly	Live	220	32	6	1	3		5	4	4	4			
14	**90**	Loblolly	Live	227	33	6	1	3		5	4	4	4			
14	**91**	Loblolly	Live	246	31.5	6	1	3		5	4	4	4			
14	**100**	Loblolly	Live	256	44	4	1	3	2	5	4	4	4			
14	**101**	Loblolly	Live	265	43	1	1	1		5	3	3	3			
15	**160**	Unknown	Live			6	1	3		5	4	4	4	New insert		
15	**161**	Unknown	Live			6	1	3		5	4	4	4	New insert		

Appendix II continued

Cluster	Tree	Species	Condition	Direction	Height (feet)	Cavity Stage	t	Activity	Depth (inches)	Plate	Chipping	Dry Sap	Fresh Sap	Comments	Needs face repair	Needs major repair
15	**162**	Unknown	Live			6	1	3		5	4	4	4	New insert		
15	**163**	Unknown	Live			6	1	3		5	4	4	4	New insert		

Appendix III. Occurrences and management of competitors in Red-cockaded Woodpecker cavities in Piney Grove cavity during 2007.

CLUSTER	Tree	Date	Occupant	Date	Occupant	Date	Occupant
1	35						
1	36						
1	37						
1	38	06/12/07	Pibo Nest-1 nestling				
1	39	11/11/07	Nest Material Removed				
1	40						
1	41						
1	42						
1	43						
1	44						
1	45	04/22/07	Sica Nest				
1	46						
1	47						
1	48						
1	49						
1	50						
1	51						
1	52	04/22/07	Glvo removed	11/11/07	Glvo removed		
1	53						
1	54						
1	55						
1	57						
1	102						
1	117						
1	58						
2	60						
2	61						
2	62						
2	63						
3	1						
3	2	06/12/07	2 Glvo 1removed; 1 flushed				
3	4						
3	5						
3	6						
3	7						
3	8						
3	71						
3	72						

CLUSTER	Tree	Date	Occupant	Date	Occupant	Date	Occupant
3	74						
3	75						
3	76						
3	77						
3	80						
3	177	07/26/07	2 Glvo removed				
3	178						
3	3a						
3	3b						
3	79a						
3	79b						
3	79c						
3	9a						
3	9b						
3	9c						
4	81						
4	82						
4	83						
4	84						
4	186						
5	20						
5	21						
5	22						
5	23						
5	24						
5	25						
5	26	06/07/07	Pibo Nest - 2 nestlings				
5	27						
5	28						
5	29						
5	30						
5	92						
5	93						
5	94						
5	95						
5	96						
5	97						
5	98						
5	99						
5	127						
5	138						
5	191	06/07/07	Glvo flushed	07/26/07	Glvo flushed		
6	10						
6	11						
6	12						
6	13						
6	116	06/07/07	Hych				
6	135	06/07/07	Nest Material	10/11/07	Nest material	02/07/07	Nest material removed
6	137						
6	139						
6	136a						
6	136b						
7	105						
7	106	04/22/07	Pine straw in bottom	05/02/07	Pibo nest 3 eggs		
7	110	04/14/07	Sica nest	07/15/07	Nest with 5 white/blue	08/15/07	5 eggs removed

CLUSTER	Tree	Date	Occupant	Date	Occupant	Date	Occupant
					eggs		
7	111						
7	112						
7	113						
7	114						
7	115						
7	195						
8	170						
8	171						
8	172						
8	173	06/12/07	Elob				
8	174						
8	NTa						
8	NTb						
8	NTc						
8	NTd						
9	85						
9	86	04/14/07	Sica on tree	04/22/07	Glvo removed	05/24/07	3 Glvo removed
9	87	04/22/07	Glvo removed	05/24/07	Glvo removed	08/15/07	Glvo removed
9	88	07/15/07	Glvo flushed				
10	64	04/14/07	Sica Nest 1 egg & shell	04/22/07	Pibo nest - 3 eggs		
10	65						
10	66	04/22/07	2 Glvo removed				
10	67	04/14/07	2 Glvo flushed				
10	150	04/22/07	Glvo flushed	11/11/07	Glvo removed		
10	151						
10	152						
10	153						
11	140						
11	141						
11	142	04/22/07	Pabi nest two brown eggs				
11	143	04/14/07	Sica on tree				
12	130						
12	131						
12	132						
12	133	06/07/07	Elob				
12	189						
13	118	11/11/07	2 Glvo				
13	119						
13	120	02/07/08	Nest material removed				
13	121						
13	122						
13	123						
13	124						
14	88						
14	89						
14	90	03/21/07	Glvo removed	06/07/07	Glvo flushed		
14	91	06/07/07	2 Glvo 1 flushed; 1 removed				
14	100						
14	101						
15	160						
15	161						
15	162						
15	163						

CLUSTER	Tree	Date	Occupant	Date	Occupant	Date	Occupant

Occupant key to Appendix III.

Code	Occupant description	Code	Occupant description
Bosp	Bumble Bee species	Pibo	Red-cockaded Woodpecker
Glvo	Southern Flying Squirrel	Posp	Polistes wasp species
Hych	Gray Treefrog	Sica	White-breasted nuthatch
Elsp	Rat Snake species	Sisi	Eastern Bluebird
Pabi	Tufted Titmouse	Unsp	Unknown mud wasp species